REMARKS

The last Office Action has been carefully considered.

It is noted that claims 1-25 are rejected under 35 U.S.C. 102 over the patent to Kakizaki.

Also, claims 23-24 are rejected under 35 U.S.C. 112.

In connection with the Examiner's formal rejections of claims 22-24 under 35 U.S.C. 112, applicants have amended these claims so that they now depend on claim 21 which defines a component assembly. Therefore, there is sufficient antecedent basis in these claims for the "component assembly". As for claim 21, the incorporation of the component assembly "integrator" in the scaling circuit is shown in Figure 9. The component assembly formed as an integrator is important, since by forming a closed control circuit by means of the shown feedback coupling the computation error of the multiplier can be avoided. The prior art solution disclosed in Figure 8 and in U.S. patent to Kakizaki, example 2 has the disadvantage that the computation error of the division module in the initial quantity cannot be produced fully and in uncompensated way. In accordance with the prior art, without feedback coupling the accuracy required for the industrial applications can not be maintained. Therefore the controlled

multiplication by means of an integrator is an essential component of the present invention.

The functionality defined in claim 23 can be achieved with a low-pass alternatively, since it also has an integrated characteristic, but typically possesses an endless integration time constant. The functionality defined in claim 24 can be achieved alternatively with a peak value rectifier. It also has an integrated characteristics with different constant than those defined in claim 22 and 23.

It is therefore believed that the Examiner's grounds for the formal rejections of claims 22-24 should be considered as no longer tenable and should be withdrawn.

Turning now to the Examiner's rejection of the claims over the art, and in particular over the patent to Kakizaki, it can be seen that the reference utilizes only one sensor crystal. In contrast, in the applicant's invention at least two sensor crystals are utilized. An important advantage of the present invention is that the measurements of the electrical voltage in accordance with its definition is executed with the integration of the electrical field intensity, wherein the field intensity integral is obtained by a summation of a plurality of electrical partial field intensities.

If only one sensor crystal is utilized as disclosed in the reference, then the principle used in the applicant's invention can not be utilized. The advantage of the present invention over this prior art is that, an electrical voltage can be measured inexpensively and highly accurately, while the electrical strength of the sensor crystal in principle does not limit the amplitude of the voltage to be measured. The issues here are not primarily the existence of a second sensor crystal, but the further arrangements of further sensor crystals for the above described person. This is not disclosed in the reference.

It is therefore believed that claim 1 should be considered as patentably distinguishing over this reference.

In regard to claim 2, in the reference for voltage measurements a recordation plate is utilized, which has a double refraction and a temperature dependency. The expression "double refraction" is physically not definite since there is linear as well as circular double refraction. From the equation 11 in column 10 and legend, in particular variable theta in line 28 it is clear that the temperature dependency in column 11, equation 15 utilizes the linear double refraction.

In contrast, in the applicant's invention the temperature dependency utilizes the circular double refraction for determination of

temperature as can be confirmed by the equations 9 and 10. This also goes from the "temperature dependency of the optical activity" (optical rotating power) which is identical to a circular temperature-dependent double refraction. In connection with the voltage sensor, this feature of the present invention is also new.

As for the Examiner's rejection of claims 3, 17-20, 25, the expression "a plurality of optical sensors disposed in parallel" should be considered with the proceeding paragraph and the expression "although". It is mentioned that up to now during measurements of "many physical quantities" the number of optical sensors increases". This expression is clear and easy to comprehend. In the applicant's invention not many optical elements are utilized, but instead a single voltage sensor. The plurality of sensor crystals "which alone are not sufficient during measurements of the voltage" is not mentioned. Furthermore, the sensor crystals are electrically connected in series and not parallel. The same is true for the described sensor elements 20 and the sensor active part 21 which are also connected in series with one another.

With regard to claims 4-7, 20 the cascading of the sensor elements 20 in the sensor active parts 2 deals with an advantageous embodiment for high voltage application. Due to the optical "electrically

passive" sensors, inherent properties of the electrical installation can be provided as defined in the claims.

In connection with the rejection of claim 7, the reference discloses that the DC quantity and the AC quantity are utilized over the measurements. This is the prior art and generally known. In contrast, in accordance with the applicant's invention, the component assembly which determines the DC component is located in a control loop. The objective of the control loop is the scaling (elimination the influences of the light intensity of the light source on the measuring signal and elimination of the damping influence of the transmission stall) of the corresponding electrical quantities, so that the computation error of the scaling component assembly or in other words the determined scaling factors have no influence on the output values. In the present invention therefore a new type of a closed control loop is proposed which executes the above. The shown control loop in Figure 4, when compared with the known solution, has an important feature since the computing error of the division component assembly of the old solution can falsify the measuring signal.

In claim 9 a plurality "NSK greater or equal to Q WO" of sensor signals is supplied for the reasons specified in the analysis of claim 1. This is an important component of the measuring principle and also it is completely new.

With respect to claims 9-13, while the plurality of sensor elements 20 and the sensor active part 21 can be considered as inherent, the number NSK of sensor crystals is new, for the same reasons as were discussed with respect to claim 1.

As for the rejection of claims 11, 12, 14-16, the "rotary element" is used for measurements/compensation of the magnetic field intensity H (see Figure 1 of the reference). In the present application, the element rotating the polarization axis is used during the measurement/compensation of the electrical field intensity. Therefore the use for this case is new, so that claims 14-15 are clearly different. Also, the material Bi4Si3012 and Bi4GE3012 are not mentioned. The use of these materials defined in claims 11 and 12 for the purpose of the above described optical measurements is new.

Claim 25 describes the component assembly, in particular its connection. It is important and new for the operational principle that a feedback coupling is utilized for avoiding the computation errors as specified above and in Figure 9. The use of the corresponding components for the function unit of claim 21 is also new.

It is therefore believed that the new features of the present invention which are defined in the above listed claims are not disclosed in the

patent to Kakizaki and can not be derived from it as a matter of obviousness. These claims should be considered as patentably distinguishing over the art and should be allowed.

The patents to Takahashi and Okajima were not applied against the claims, but merely cited as of interest. The patent to Takahashi discloses a proposal which utilizes a partial reflectivity of optical border layers for measuring effect amplification. The patent to Okajima utilizes a deviating computation algorithm for compensation of the temperature influences.

Both references do not use the principle underlying the applicant's invention, in particular the measurement of the electrical voltage by integration of the electrical field intensity, wherein the field intensity integral is determined by summation of a plurality of local electrical field intensities with the use of a plurality (more than two) of sensor crystals. It is therefore believed that these references also do not teach the new features of present invention.

In view of the above presented remarks and amendments, it is believed that the present application should be allowed, and such action is earnestly solicited.

Reconsideration and allowance of present application is most respectfully requested.

Should the Examiner require or consider it advisable that the specification, claims and/or drawings be further amended or corrected in formal respects in order to place this case in condition for final allowance, then it is respectfully requested that such amendments or corrections be carried out by Examiner's Amendment, and the case be passed to issue. Any costs involved should be charged to the deposit account of the undersigned (No. 19-4675). Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing this case to allowance, he is invited to telephone the undersigned (at 631-549-4700).

Respectfully submitted,

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